

These results show that the mean temperature of the air on the hill must be lower than the temperature of the free air at the same height because the temperature on the hill never rises appreciably above the temperature of the free air but frequently falls considerably below it.

Since the mean temperature above every peak that has been compared with the temperature of the free air at the same height has been found cooler than the free air, it follows with a high degree of probability that the air above all mountain peaks averages colder than the free air, and as the chief cause is evidently the adiabatic expansion of air driven up the sides of the peak, the difference between the temperature of the peak and the free air probably increases with the height of the peak. From the conditions observed at Blue Hill it is easy to compute that the temperature above the tops of such peaks as Mount Washington, Pikes Peak, the Sântis, and the Sonnblick might be 15° to 20° F. colder than the temperature of the free air at the same height. At Blue Hill, and probably elsewhere, this cooling is greatest in cyclonic conditions when the wind is driven up the sides of the peak with greatest force.

If the air passing over a peak is cooled more than the surrounding air it will sink to a lower level than the top of the peak on the leeward side on account of the greater specific gravity of the cooler air. That this condition exists at Blue Hill is evident on days when clouds are passing somewhat above the summit of the hill. These clouds are seen to sink below the level of the top of the hill on the leeward side and do so for hours in succession.

(5)—ERRORS DUE TO THE OBSERVATIONS BEING LIMITED TO CERTAIN WEATHER CONDITIONS.

It is sometimes supposed that records obtained by means of kites are confined to certain weather conditions. For example, it is supposed that the records are obtained chiefly when the wind is above normal and not at all when the wind is very light. The kite, however, is not necessarily thus limited. The pressure, temperature, and wind velocity on the days of kite flights at Blue Hill do not differ in the average from the mean obtained from all the observations at the observatory taken in all conditions of weather; records have been obtained with the kites in all kinds of winds at the earth's surface, varying from a calm to a gale.

(6)—ERRORS IN DETERMINING THE VERTICAL GRADIENTS DUE TO SIMULTANEOUS CHANGES IN THE WEATHER CONDITIONS AT VARIOUS HEIGHTS WHILE THE INSTRUMENT IS MOVING VERTICALLY FROM POINT TO POINT IN THE ATMOSPHERE.

Since the weather conditions sometimes change rapidly while a kite is moving from point to point in the air, great care is needed in comparing records obtained at different levels; different conditions assumed to be due to differences of level may in reality be due to changes taking place simultaneously at both levels. A temperature gradient derived from the record of a kite meteorograph during the day may sometimes seem to exceed the adiabatic rate when the temperature of a large mass of the atmosphere is falling. For while a kite is rising from one point to another the temperature decrease shown by the meteorograph is the normal decrease with increase of height plus the decrease taking place in the body of the air.

The errors included under (5) and (6) will be considered in greater detail in the discussion of the observations in the *Annals of the Astronomical Observatory of Harvard College*, for which the above is a preliminary study.

MR. GIDEON S. JONES.

Mr. Gideon S. Jones, Assistant Observer, Weather Bureau, died at Columbus, Ohio, March 9, 1904, after an illness of three weeks, due to typhoid-pneumonia. Mr. Jones was born in Oxford, N. C., January 10, 1868. Most of his boyhood was spent

at Madison, Wis. He entered the Weather Bureau in 1892 as an assistant observer. His duties were performed at the following-named points: Norfolk, Galveston, Charleston, Cincinnati, Yankton, Des Moines, and Columbus. He was a kind hearted and genial companion and popular with his associates.

THE TRANSVAAL OBSERVATORY.

By R. T. A. Innes.

This new meteorological institution is built on a range of hills 3 miles northeast of the city of Johannesburg. Its altitude is 5900 feet above sea level. Its latitude is 26° 6' south. The instruments now being fixed there included a Sprung-Fuess barograph, a Dines-Baxendell anemometer and pressure plate, Callendar platinum resistance thermographs, Callendar sunshine recorder, Hoser lightning recorder of the type sent to the St. Louis Exhibition, Zeiss distance finder for work on clouds, Halliwell rainfall recorder, as well as complete sets of the more usual meteorological instruments. There are 24 outside barometer stations mostly at altitude of 4000 feet or more, and 198 rainfall stations, but the authorities are endeavoring to double this latter number in the coming season.

CLIMATE OF SIBERIA, KOREA, AND MANCHURIA.

By Prof. E. B. GARRIOTT, in charge of Forecast Division.

Korea and Manchuria may be compared in area and latitude with the group of Atlantic States of the United States that extends from North Carolina to Massachusetts. The climate of this region differs materially, however, from that of the eastern part of the United States. In eastern Asia the summers are short, with warm days and cool nights, the spring and autumn seasons are transitory, and the winters are long and cold.

Meteorological records at Vladivostok, which has about the same latitude as Boston, fairly represent the climate of northern Korea and adjacent parts of Manchuria. In those regions the monthly mean temperature remains below freezing from October to April, and the surfaces of the rivers serve as highways of travel five and six months in the year. At Vladivostok the annual mean temperature is 40.2°, as compared with 48.6° at Boston. At Boston, however, the monthly mean temperature is below freezing only during December, January, and February, with the lowest mean, 27°, in January, as compared with 7.4° at Vladivostok for the same month.

THE COLD OF SIBERIA.

In Siberia, along the line of the Transsiberian Railway, the climate is very severe. Great mountains shut off this region from the moderating influences of the oceans to the east and south, and from October until late in the spring it is exposed to the sweep of cold winds from the Arctic Ocean.

Lake Baikal, which cuts the line of the railway, and the region thereabouts is subject to heavy falls of snow, and the monthly mean temperature is above freezing only during July, August, and September. During the three winter months the monthly mean temperature at Lake Baikal is below zero, with the lowest mean, 6.8° below zero, in January. As a result of the low temperatures Lake Baikal is usually frozen to a great depth by January and remains in that condition three or four months.

The maximum temperatures of the short summer seasons in Siberia, northern Manchuria, and northern Korea are quite high and frequently range above 90°, even as far north as Verkhoyansk, where the January mean temperature is 56.2° below zero and the lowest absolute minimum temperature noted on the earth's surface, 90.4° below zero, has been recorded. Over a great part of Siberia, in fact, mercury often freezes in November, while in December, January, and February mercury remains frozen for weeks together in southern Siberia.

MANCHURIA AND COREA.

Manchuria, as a whole, possesses many fertile valleys that